

## ABSTRACT OF THE DISCLOSURE

A system is provided for generating high-energy particles and for inducing nuclear reactions. The system includes a laser and for emitting a laser beam, an irradiation target for receiving the laser beam and producing high-energy particles, and a secondary target for receiving the high-energy particles, thereby inducing a nuclear reaction. A method is also provided including producing a laser beam of high-intensity with an ultra-short pulse duration, irradiating the laser beam onto an irradiation target in order to ionize the irradiation target and produce a collimated beam of high-energy particles, and colliding the collimated beam of high-energy particles onto a secondary target containing a nuclei, thereby inducing a nuclear reaction on the secondary target.